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III. *An Experiment shewing, that the Springs or Constituent Parts of Air are capable to suffer such disorder, by a violent impulse, as to require time to recover their Natural State ; by Mr. Fr. Hauksbee, F. R. S.*

THE foregoing Experiment, being so very odd in its appearance, gave me the Curiosity to enquire a little farther into the matter of Fact, and to try whether Air could be capable of being Wounded, (if I may call it so), or to suffer such a disorder of Parts, by a violent impulse, as to require time to recover their Natural State : I devised the following Experiment.

I took my Condensing Engine, (which is so well known to this Society, I shall not need to describe it here) ; into the bottom part of its Brass Receiver I put about half a Pint of Water ; then the upper part being screw'd strongly on, I threw into it, with the Syringe, about 3 or 4 Atmospheres of Air (as near as I could guess), suffering it to remain in that state sometime more than an Hour ; then letting out as much of the Air (by taking off my Syringe) as would readily depart, I immediately screw'd on in its Place a Box of Leather Collars, through which pass a small Glass Tube, whose lower Orifice was plung'd under the Surface of the included Water. I found in a very little time the Water had ascended in the Tube near a Foot, and continued rising

rising for some time, till it had reach'd near 16 Inches ; which plainly shews, that the Springs of Air, by being somewhat over bent, do not presently (altho at Liberty) recover their Pristine State. And were they to suffer a more violent compressure, and to remain for a Week, Month, or a Year, in the same State, I doubt not but according to the length of time, and degrees of Condensation, a proportional time would be requir'd to recover them to their Natural State again. But what is the Force made use of in this Experiment, in comparison to that of Fir'd *Gunpowder*, where the suddenness, and violentness of the Impulse, is unaccountable ; however, it serves well to confirm the Suggestion I had, that Air might so suffer in its Parts by Force or an Unnatural Extention of them, as to require time to recover their Pristine Natural State.

Upon a Repetition of the same Experiment, only the Condensed Air remained in the same state, as at first injected, for about 18 Hours : then letting out the Air as before, the Premention'd Box with its Tube was screw'd on ; and upon Observation I found, that as the Springs of the Air did unbend themselves, so they press'd more and more on the Surface of the included Water, which rais'd it higher and higher in the Tube, as they approach'd nearer their Natural State. This continued for about 6 Hours, at which time the little Tube was accidentally broke, and our farther Observations for that time frustrated.